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ABSTRACT

A study examined how organizational members describe their use and perceptions of electronic mail systems. Fifty-five subjects with access to electronic mail systems were interviewed at two organizations. Results indicated that subjects used the electronic mail system in the following ways: 84% for memos, notes, and correspondence; 53% for voice mailing; 37% for updating calendars and setting up meetings; 30% for obtaining or communicating necessary information; 22% to obtain technical information; 15% for brainstorming and problem solving; and 2% for document preparation. In general, results suggest that automated office systems have little or no impact on healthy interpersonal relationships and in some cases the system extends social interaction with other organizational members. However, the data also suggest that when interpersonal relationships or organizational climate are faltering, technology may contribute to the continued deterioration of the situation. Electronic mail systems clearly change the way that employees communicate, process information, and develop and maintain relationships. (The interview guide used to collect data is appended.) (SRT)

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# Techno-Sense: Making Sense Out of the Technological Impact on Human Communication

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*This paper is the result of collaborative effort among these individuals. Dr. Sue DeWine served as the project director. This paper is also part of a larger investigation on the effects of communication technology in organizations.

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Techno-Sense: Making Sense Out of the Technological Impact on Human Communication Systems

The evolution of the information age has resulted in a host of new technologies being introduced into organizations with increasing swiftness. Electronic technologies affect human communication systems which are the essence of organized activity and out of which other organizational processes flow (Barnard, 1938). By altering communication processes through the use of electronic technologies, fundamental changes are occurring in the way that human beings communicate, work, and play in the organization (Gengle, 1984). A host of organizational researchers have begun to theorize, research, and write on the impact of new electronic technologies on organizational communication processes (Albertson, 1977; Brod, 1984; Carter, 1984; Champanis, 1972; Hiemstra, 1983; Hiltz, Turoff & Johnson, 1985; Johansen, Vallee, & Spangler, 1979; Kiesler, Siegel & McGuire, 1984; Naisbitt, 1982; Penrose, 1984; Rice, 1982 & 1984; Short, Williams, & Christie, 1976).

The purpose of this study is to examine how organizational members, using advanced technology, describe their use and perceptions of technology. More specifically, this study is an attempt to develop categories from interview data such that themes can be derived. It is assumed that the rich data obtained from semi-structured interviews will allow the researchers an

opportunity to provide "thick descriptions" (Geertz, 1973) of organizational members use and perceptions of technology in their organization.

The organization of this paper is as follows: an overview of technology, a review of literature suggesting the impacts of technology on organizations, qualitative and quantitative methods used, and results and discussion.

**Overview of Technology**

Many authors have spoken of the coming of the information age (Drucker, 1980; Hiemstra, 1983; Naisbitt, 1982). The information age refers to a majority of economic activity being associated with the creation, manipulation, and dissemination of information (Rice, 1984). There are a great many technologies associated with the advancement of the information age, some of which include telecommunication and teleconferencing (video, audio, and computer), word processing, electronic and voice mail, electronic filing, and relational data bases (Hiemstra, 1983; Kronkie, 1984; Rice, 1984).

In its infancy, electronic technologies (especially the computer) were applied to improvements in dealing with information such as payroll and inventory (Lederer, 1984). Technology exists for purposes of maintaining the integrity of and providing access to information needed for controlling and planning organizational activities (Theil, 1984). However, in recent years electronic technologies have also been applied to the creation of new mediums and networks to facilitate human communication.

An integral part of the technological office of the future is the integration of information and networking of personal computers in order to facilitate information sharing and human communication up, down, and across the organization (Perotti, 1984). Many view electronic mail systems as the cornerstone of the office of the future and essential to tasks of knowledge workers (Blair, 1984; Drucker, 1980). The emphasis of this study was on professional office automation systems (PROFS). However, the interviews solicited subjects' views of the impact of general technology on their organizational and personal lives.

The PROFS system is one that facilitates the use of electronic memos, calendering, and scheduling of facilities. PROFS users are able to send and receive documents and memos from other users and are able to schedule meetings by checking other's calendars for times available. The PROFS system may also allow the user to verify the receipt of a message sent and to electronically check the schedule of others before scheduling a meeting time.

**Technologies Impact**

There is considerable literature suggesting the impact of computer related technologies on the organization. The purpose of this section is to review the research that seems to be particularly relevant to this study.

One area of interest is the effect that technology has on the activities of managers. One author suggested that management must change to take into account the nature of the knowledge

worker in the information age (Drucker, 1980). Because technology influences how information is dispersed in the organization and because information is power, technology may potentially alter power relationships within organizations (Goldhaber, 1978; Perotti & Perotti, 1984). Altering the flow and availability of information through the organization has also suggested alteration in status relationships in the organization (Kiesler, Siegel, & McGuire, 1984). The effect of relational data bases and electronic mail systems appears to significantly alter information processing within the organization and philosophies about information management are and will continue to change.

Researchers have also suggested that social control and influence issues may be altered when computer mediated communication systems are used (Hiltz & Turoff, 1984; Kiesler, et al., 1984). One writer reported that the installation of an electronic mail system at one IBM facility became known as GRIPENET (Emmet, 1981). Other researchers have found that CMC interactions tend to possess higher levels of deindividuation (probably due to possible use of anonymity in CMC) and less inhibition than face-to-face communication (Danowski, 1982; Hiltz, Turoff, & Johnson, 1985).

Another area of interest with the coming of the information age is the extent to which technology may result in a depersonalization of work environment. Hiemstra (198 ) noted that technology may evoke depersonalization by eliminating the amount of face-to-face communication that occurs within the

organization. When face-to-face communication is eliminated in CMC, the nature and function of nonverbal communication processes are significantly altered (Fulk & Van Tassel, 1985). However, some have suggested that those using CMC found ways of giving hugs, kisses, and screams (Pollack, 1982). There is much research that is needed on the impact that technology in the information age will have on human relationships in organizations. It appears to date that there are not an abundance of negative repercussions to arouse concern.

Researchers have also been interested in repercussions of computerphobia, and one researcher observed subjects swearing and shouting at terminals due to frustration (Rauchenberg, 198 ; Kiesler et al., 1984). Because of the rapid developments of technology in the last forty years, organizational members are likely to possess a high level of variance in regards to their level of comfort with computer technologies. The "information geru" or "technology geru" is a relatively new happening in organizations. Hiemstra (1983) described the technology geru as one who understands corporate technologies and uses them efficiently to gather information and power and thereby is able to move up through the organization rapidly.

Researchers have also been interested in the effect that technology has on organizations and tasks. One study found that information technology and unit size were two variables that explained much of the variance in the structure and behavior of effective organizational units (Randolph, 1980 ). It has also been noted that blue collar workers are increasingly being called

upon to interact with computer technologies in order to control a variety of manufacturing operations (Smeltzer, Glab, & Golen, 1983).

It is clear that new computer related technologies are altering the dynamics of organizational communication. While a great deal of the research does and should take the form of isolating and analyzing specific technologies, this study is an attempt to obtain rather general statements from organizational members in regard to their perceptions of the impact of technology on their lives within the organization.

**Methodology**

A total of 55 subjects were interviewed at two organizations. Twenty-nine interviews were conducted at the corporate office of a national financial planning company and 29 interviews were conducted at a regional office for a computer sales organization. Subjects from the financial planning company were randomly sampled from 1,000 employees, all of whom had access to an electronic mail system. The system had been in place for about four years however one-half (500) of the users had been added in the last year previous to the study. Managers claimed usage of the electronic mail system by virtually all 1,000 employees. The computer sales company was a regional office that had approximately one computer for every two employees. Each of 500 employees had access to an electronic mail system as well as a voice mail system, however, managers reported approximately a 50% usage rate. This system had been in place for approximately two years.

Each of the organizations are what would be considered high-tech. Both have sophisticated data bases which are required for employees to complete their tasks. The environment is open; employees have either a work station existing within a open room or a work station that is set apart with partitions about six feet high. Only managers and supervisors have closed offices which are usually located in the corners or along the outside walls of the floor. In the financial planning firm the 1,000 electronic mail users are spread between three buildings each within one block of another. Each organization had hierarchical structures.

Structured interview guides were used, however, interviews were moderately scheduled so that follow-up questions probed the particular responses of each interview (See Appendix A). Each interview lasted approximately 30 to 45 minutes. Each interviewer was accompanied by a recorder who took notes during the interview. A total of eight interviewers participated in the data collection. Summary transcripts were content analyzed to determine major themes. The number of times interviewees made statements that related to the impact of new technology on the following communication variables were noted: quality and quantity of interpersonal communication, length and content of message structure, positive and negative job changes, physical, psychological, and procedural changes in the work environment, information availability, office efficiency, and future impacts of office environment.

## Results and Discussions

### Electronic Mails Systems Use

When subjects were asked how they used the electronic mail system, 84% said they used it for memos notes, and correspondence; 53% of the subjects at the computer sales company stated that they used the voice mail system; 37% of the subjects said they used electronic scheduling for updating calendars and setting up meetings; 30% said they used the system for obtaining or communicating necessary information; 22% said they used the system to obtain technical information; 15% said they used technology for brainstorming and problem solving; and only 2% said they used the system for document preparation.

### Impact on Interpersonal Communication

There were one hundred and twenty statements made in reference to the impact of technology on interpersonal communication. Of these statements, 70% of them dealt with the subjects' perceptions of the impact on quality of interpersonal communication and 30% with the impact on the quantity of relationships. Fifty percent of the statements were positive, 23% were negative, and 27% were neutral.

The impact of technology on human relationships is not yet clear. One subject seemed to be heartened by being admitted onto the EM system because it would require less face-to-face interaction with a considerable group of coworker which the subject considered to be "chicken s____." The researchers struggled with the appropriate classification of this statement

as positive or negative; in the final analysis the comment was categorized as a positive interpersonal statement since from the subject's perspective EM would assist in the improvement of what would be classified as faltering relationships with coworkers.

Another incident was particularly revealing regarding the potential impact that EM systems may have on interpersonal relationships. A manager who was finishing the last week before retirement, received a EM note of congratulation from a superior for 23 years of excellent service to the company. The employee was so angered by the incident that he went to the person who was coordinating the research project and stated that though he was not scheduled for an interview by the research team he/she wanted to say what he thought of the EM system. The employee felt that 23 years of service deserved a personal visit by a superior instead of an electronic message. The corporate person who was coordinating the research project stated that in the years that he had been with the company he had never seen the employee upset until this incident.

Other employees perceived EM as having a positive influence on their relationships with others. One subject stated that EM made it possible to communicate with others who were not otherwise accessible because of the interfering nature of problems of telephone tag or because of the interfering nature of a telephone call. Others representative statements were: "PROFS helps me communicate because I don't communicate well verbally"; "My communication has improved by being able to write down my ideas"; "Technology means that our supervisors now have more

respect for us--we gain a mutual respect and knowledge"; "Technology has allowed more feedback to occur."

In analyzing the data, it becomes clear that if one thinks in terms of positive and negative impacts of technology, it may be both simultaneously. For example, one subject told of his/her supervisor had the reputation throughout the organization of being a programming genius. With the introduction of PROFS, the subject described the visual disappearance of the supervisor and the appearance of too numerous and too long memos (documents) from the supervisor to subordinates. The subject was dissatisfied with this idea of management via electronic mail and on numerous occasions expressed the importance of personal contact and especially the importance of eye contact. For the subject, the introduction of EM was negative in regards to the relationship with the supervisor, and yet the supervisor may feel positive about EM because of a preference for writing or interpersonal verbal interaction.

Another interesting finding from the interview data dealt with the use of the EM system for social purposes. When subjects were asked if they used the system for social interaction with co-workers a vast majority acknowledged that they did. When asked about social uses, subjects guilty couched their response in the context that "everyone does." One subject stated that "There is a hell of a lot of stuff about how bowling and golf are going." One manager stated that he/she occasionally checked subordinates EM in order to determine that it was not being used for inappropriate reasons.

The researchers also asked if there were an organizational policy regarding the use of EM for social purposes and consistently received conflicting responses. Management maintained that no specific policy had been established on social use but that it would not be appropriate for people to be sending love letters back and forth on the corporate EM system.

It was apparent from the interviews that an ambiguous informal rule had developed regarding the use of EM for social purposes. One critical incident may have contributed significantly toward the development of this unwritten rule. A company programmer had programmed the system so that the last work day before an Easter weekend, as each EM user would log on to check the morning mail, a bunny rabbit would appear on their screen. A vice president of the company called the programmer in and as the story goes the programmer almost lost his/her job because this was considered inappropriate use of the system. Though the general feeling seemed to be that using the EM system for social purposes was acceptable, there was a line that one should not cross in terms of how much it was used socially.

The analysis of the interview data suggests a number of general conclusions about the impact of technology on interpersonal relationships that may serve for future hypothesis in more confirmatory studies:

1. If a interpersonal relationship is weak in face-to-face interaction, in most instances EM will not assert a positive influence on the relationship but rather will result in the

maintenance of the status quo or will have negative influence on the relationship.

2. Persons who are interpersonally insensitive are likely to use EM systems in ways that are offensive to others, i.e., dealing with situations through EM mediums when face-to-face interaction would be more a appropriate medium.

3. When organizational and interpersonal climates are poor, EM systems will not be used in such a way as to improve the climate but rather will assist in maintaining the status quo or will contribute to a worsening condition due to interpersonal withdrawl. When the office environment or a relationship is negative, EM provides a way for organizational members to stay in their offices and avoid having to interact with the environment.

4. When interpersonal relationships are healthy and the climate positive, EM systems do not have negative impacts on interpersonal relationships and in many instances are used to increase information sharing and the development of new and old relationships.

5. Though EM systems are oriented toward effective and efficient task accomplishment, it is also used for social purposes.

**Message Structure**

The subjects were asked about their perceptions of how message structure has changed with the introduction of the EM system. Forty-six percent of the respondents indicated that messages sent and received through electronic means were shorter. There appeared to be a agreement that EM "cuts out small talk on

extraneous things," "makes it short and crisp," and "I send out quick memos."

In both of the organizations used in this study, there were few secretaries in the traditional sense. Supervisory and nonsupervisory individuals were expected to type in their own EM messages messages but could and did use word processing centers for the preparation of longer documents. The financial planning company had stated that internal EM memos were not required to be grammatically correct and users should feel free to send messages to one another without this concern.

Another interesting perspective of message structure was that which dealt with the content of messages. As was previously discussed, social messages are common in the system but as one would expect the system exists for task related purposes. The question of confidential information often came up in the interviews and subjects were asked if they would have any reservation about sending or receiving confidential information over the EM system. The general consensus appeared to be that there was no reservation in sending or receiving confidential information since one's password was confidential and others could not access your mail. The exceptions included those who believed that their managers above them could access their mail and one department where a user was making a hard copy of confidential information and, in doing so, employees saw the information as it was printed on public printers. In these cases, the interviewees expressed reservation about using the EM system for confidential information. There were conflicting

opinions as to whether or not others in the organization could access another person's mail; some said that it could be done and others insisted that only they knew their password and thus no one else could get into their mail.

**Impact on Jobs/Status**

The interview data revealed that technologies in general and EM in particular are significantly impacting the work done in organizations. When asked how their job has changed due to technology, 56% of the statements were positive, 22% were negative, and 22% were neutral. The impact appears to reach to virtually all levels of job and status in the organization.

One clear example is the traditional role of secretaries. In one instance, the organization was attempting to convince a long-time manager that due to office automation a personal secretary for his/her assignment would no longer be necessary. Eventually, the organization insisted that the secretarial position be eliminated; and in order to avoid this, the manager changed the secretary's title to life technician. This allowed the manager to keep the secretary and the secretary to keep the job. Interestingly, both are long-time employees and not active users of the EM system.

In order to facilitate the implementation of the EM system throughout the organization, one or two persons on each floor are assigned as local technical support (LTS) persons. In most cases, this person will be the secretary assigned to that floor. The secretary receives extra training on the system and is

expected to be a resource for others. In many cases this places the secretary in a position to be the instructor for those others who are superiors. One secretary expressed bewilderment because managers did all their own typing and the assignment as the LTS placed her as secretary, with only a high school diploma, in a position to advise corporate managers on a technical system. The secretary's job and status had changed significantly because of technology.

EM systems are also associated with employees feeling more productive and efficient in their work. Statements such as "I bang out more stuff," "I feel like I accomplish more," "I feel like I'm more productive," "My workload has increased but it doesn't seem like it" were representative statements among the subjects. Employees acknowledged that their "workload now could not have done ten years ago."

The organizations require a process of cost justification before new technologies can be purchased or before employees can be placed on systems like EM. Though one might assume that with the addition of an EM system employees would feel pressure to be more productive, employees did not express concern about such expectations. Subjects acknowledged that the expectations did exist but that it was impossible to measure productivity with the kind of work that they did; and, therefore, pressure did not exist after obtaining the technology.

Though employees apparently do not feel high levels of pressure to perform, they do express frustration in having to learn new systems and in being given inadequate training. One

subjected stated "I get damned fed up with having to learn a new system." Another subject stated that just as technology is changing quickly, people must learn just as quickly in order to take advantage of those changes. One representative statement in reference to training and learning a new system was that "training classes talked way over my head" and another long-time employee expressed concern about having to learn the system quickly when "I knew I couldn't."

Finally, there appears to be some evidence that supporrts Hiemstra's (1983) notion of the information geru. Because information technology is associated with higher levels of productivity it follows that those who can master the technologies quickly are able to impress their superiors and move up through the organization. One subjected stated "Technology has effected my personal advancement through knowing how to use the technology."

The interview data supports that proposition that technology is significantly influencing the nature of work in the organization and status relationships of organizational members.

**Work Environment**

Subjects were asked, "What changes in the work environment have occurred?" A majority of subjects indicated that the introduction of technology had not significantly influenced the physical environment either positively or negatively. Therefore, the interview data indicates that according to the perceptions of the subjects technology and environment do not interact significantly.

**Information Availability**

Subjects appeared to be in agreement that EM technologies influence the availability of information in the organization. It appears that employees receive and access more information and are able to deal with it efficiently in order to avoid information overload. Subjects report that even though they send and receive more messages they do not experience overload because the electronic mail in-basket can be reviewed so efficiently. On two separate occasions, one of the researchers sat with a EM user while going through the morning's mail. In both instances the users illustrated the efficiency in which EM can be reviewed and portions can be selected and sent on to other interested parties by simply pressing a few keys.

Subjects also reported feeling that they were better informed due to EM systems. The prevalent perception is that because sending and receiving information is so efficient more information is shared throughout the organization. Where certain information used be possessed by one's superior, that superior is much more likely to pass along information that the subordinate before would not have received. Representative statements included "I get the opportunity to keep up with what is happening in the rest of the world (the larger organization)," "I feel more informed," "I know what I need to know as well as what is nice to know," "We have everything right at our fingertips."

Another interesting aspect of information processing issues in the organization is that a number of the subjects reported a

perception of great ability to send information up the organization. One subject stated "I can send a message directly to a vice president," and another stated "I can deal more directly with the superiors," "Before PROFS I never use to write notes to my manager." One reason for these predominant attitudes may be the relatively unobtrusive and private nature of an electronic message. A employee can choose to send certain information up through the organization without having to ask a secretary to type it, another secretary to receive it, and finally the receiver can glance at the message and delete it instantly or file it. One subject noted that there have never been any written policies regarding who one can and cannot send electronic messages to directly.

**Office Efficiency**

If there is a hallmark of technology in the information age it would likely be efficiency--especially efficiency in the manipulation of information. Subjects consistently confirmed this perception by describing their task related activities as more efficient due to technology. Some of the improvements in efficiency described by the subjects included productive meetings because people come better informed with more documentation and "people cannot say that they did not get it" (the EM system possess an acknowledgment of receipt), and finally a decrease in the number of meetings because problems can be coordinated and solved over the EM system.

**Future Impacts**

Most of the subjects expressed a high degree of difficulty in predicting the future of technology in the office, even 110 years from now. These individuals observed that 10 years ago they would not have been able to predict the current office technologies. Responses to this question were categorized into nine themes; fewer people in the office, less paper, effects on home life, changes in interpersonal relationship, easier jobs, more intelligent work force, more gadgets and greater uses, less privacy, and higher costs.

Five percent of the subjects mentioned that the office of the future would contain less people. "I see clerical jobs disappearing," and "certain jobs will disappear and none to replace them," reported subjects. Eight percent of the recorded statements emphasized less paper as part of the office of the future. However, the subjects did not appear to see a paperless office; "A paper-free office is not possible, there will be people without the financial where-withal to own a PC--maybe a 75% paperless office," observed one subject. Eight percent of the statements regarded technology's effect on home. Employees appeared to be in agreement that there would be an increase in home work stations but in disagreement in terms of whether this was positive or negative. Some subjects expressed concern in coordinating family life with work life while others appeared to favor home offices and not have similar reservations. While the general theme in the present study appears to be that technology is not negatively impacting interpersonal relationships, the same

cannot be said of comments made about future impacts. Interpersonal contact is currently maintained, at least partially, because not everyone is on the PROFS system. Out of necessity, employees are required to call and see each other in order to accomplish their tasks. However, in the future when all employees are on the PROFS system, subjects expressed concern that their tasks will no longer require that they have contact with others and thus interpersonal relationships may suffer. A representative statement was that people may "see and talk to each other less." In opposition to this position another subject stated that "in the future office environments will be more impersonal if the people choose it to be."

The statements by subjects suggested that they perceive significant changes in their work. The data reflected the position that there would be less travel necessary once visual graphics are refined, smaller computer systems with greater power (one subject stated that a computer as part of a watch would be handy), video-based telephone screens, people will feel more productive and do things better, people will have to be more intelligent, and voice activated computer systems will significantly affect jobs. The common theme among interviewees is reflected in this statement, "There's no limit to what technology can do. It's all a matter of payback. It's what you want out of the system and what you want to invest into it. There's no limit."

## Conclusion

This paper has been an attempt to understand how new technologies are perceived in organizations using advanced office systems. From the interviews and the data analysis, it is clear that employees have opinions about the significance of technology in the office. One assumption of this paper has been that it is important to understand employee's views of technologies impact as well as to document impacts. Through the interview data a number of themes surfaced and are briefly summarized below.

The results from the data suggest that automated office systems have little or no impact on healthy interpersonal relationships and in fact in some cases are used to extend social interaction with other organizational members. However, the data also suggests that when interpersonal relationships or organizational climate are faltering, technology may contribute to the continued deterioration of the situation. The data also suggested that technology highlights the negative aspects of the interpersonally insensitive.

Results also revealed that internal memos are shorter, allowed to be grammatically incorrect, and that managers and nonmanagers alike attend to their own mail and type their own memos. A majority of the users feel comfortable in sending confidential information through the system. Furthermore, technology does appear to be influencing both jobs/tasks and the status of organizational members. Clerical/secretarial jobs appear to be altered significantly and those who are able to master the technology quickly, appear to have a significant

advantage over the technological illiterate. Subjects report having more to do and receiving more information but do not report it is as overload since the technology allows them to process more information (both what they need to know and what they would like to know) and accomplish more in their work. Subjects also reported greater mobility in sending information up the organization and increased accountability for information that they receive.

The future impacts of technology on the organization were reported as being fewer people, less paper, possiblity of negative impacts on interpersonal relationships, more intelligent work force, less privacy, more uses of gadgets, and more work being done at home.

It is clear from the interview data in this study that the introduction of electronic office systems are changing the way that employees communicate, process information, and develop and maintain relationships. Though it may appear from this discussion that topics and themes discussed in the paper are clearcut, the researchers acknowledge that there is wide diversification in relation to employees' perceptions of technology. Organizational communication researchers are in a position to provide a unique contribution by documenting the evolution and dynamics of diversified opinions about technology and its impact on human communication issues in the organization. The conclusions and results of this paper may contribute to a general framework by which to review employee attitudes in future research.

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# Appendix

# A

Date: Time: In____ Out___ Reporter:
With:

**Reporters Guide**

Introduce inteviewers, preview the interview, guarantee confidentiality, and ask for 30 minutes.
**Name:**

1. Position/responsibility

2. Describe communication/information technology here at ___
(e.g. electronic mail, word processing, data based systems)

3. What technology do you use here? (A) How often (B) What for

4. Effect of technology

(A) On your job 1. Work environment 2. Tasks/Resp.

(B) On your relationships 1. boss 2. peers 3. subordinates

(C) On your comm. 1. comm. style 2. choice media 3. comm with

(5) How do you feel about these changes?

6. What do you think technologies effect will be 10 years?

Any final contributions?

Assure confidentiality again. Summary of results will be made available.

Represent intensity in the interviewee's response.